

## **WHAT IS CLAIMED IS:**

1. A circuit card assembly, comprising:
  - a printed wiring board with electronic components mounted thereto;
  - a shell comprising planar sheets of composite material disposed on opposite sides of the printed wiring board, the planar sheets being spaced from each other via at least one of a spacer and a connector for electrically connecting the printed wiring board and electronic components with an external circuit;
  - a thermal filler disposed between the shell and at least one of the electronic components; and
  - a lightweight material, different in composition from the thermal filler, filling a void between the shell and the printed wiring board and electronic components that is not filled by the thermal filler.
2. The circuit card assembly of claim 1, wherein the lightweight material is made of expandable foam.
3. The circuit card assembly of claim 1, wherein at least one of the thermal filler and the lightweight material is injected into the outer shell through holes in the outer shell.
4. The circuit card assembly of claim 1, wherein the thermal filler provides thermal dissipation for the at least one electronic component.

5. The circuit card assembly of claim 1, wherein the thermal filler comprises silver-filled silicone or epoxy.

6. The circuit card assembly of claim 1, wherein the composite material comprises carbon fiber.

7. An apparatus for providing rigidity to a circuit card assembly, wherein the circuit card assembly comprises a printed wiring board and electronic components mounted thereon, the apparatus comprising:

a shell comprised of thin lightweight planar sheets for covering the printed wiring board and electronic components mounted thereon, wherein the planar sheets are spaced from each other via at least one of a spacer and a connector for electrically connecting the printed wiring board and electronic components mounted thereon with an external circuit;

a thermal filler disposed in a region between the shell and at least one of the electronic components; and

a lightweight material substantially filling any remaining voids between the shell and the printed wiring board and electronic components.

8. The apparatus of claim 7, wherein at least one of the thermal filler and the lightweight material is injected into the shell through squirt holes in the shell.

9. The apparatus of claim 7, wherein the thermal filler comprises silver-filled silicone or epoxy.

10. The apparatus of claim 7, wherein the planar sheets are comprised of carbon fiber.

11. A method of manufacturing a circuit card assembly, comprising:  
mounting electronic components on a printed wiring board, wherein the printed wiring board comprises a connector for electrically connecting the printed wiring board with an external electrical circuit;  
placing the printed wiring board with the electronic components into a shell made of a lightweight material, wherein the connector extends outwardly from the shell;  
injecting a thermal filler into the shell in a region substantially between the shell and at least one electronic component; and  
injecting a lightweight filling material to substantially fill any remaining voids in the shell.

12. The method of claim 11, wherein the shell comprises planar sheets of composite material disposed on opposite sides of the printed wiring board, the planar sheets being spaced from each other via at least one of a spacer and a connector for electrically connecting the printed wiring board and electronic components with an external circuit.